

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111
Serial Number: 09/726,629
Filing Date: November 30, 2000
Title: SOLDERLESS ELECTRONICS PACKAGING (As Amended)
Assignee: Intel Corporation

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REMARKS

This responds to the Office Action mailed on February 11, 2004.

No claims have been canceled or added by way of this amendment. Claims 35-36, 39, 42-45, 48, 51-54, 56-57, 59-60, 63, 65-66, and 69-70 have been amended. As a result, claims 35-39, 42-48, and 51-72 are now pending in this application.

For the convenience of the Examiner, Applicants' remarks concerning the claims will be presented in the same order in which the Examiner presented them in the Office Action.

Amendments to the Specification

Applicants have amended several paragraphs of the specification. These amendments have been made to provide support for corresponding language in the claims, as amended.

The paragraph beginning on page 10, line 22 has been amended by adding the sentence "In an embodiment, support 121 is of relatively uniform thickness, and it has upper and lower sides." Support for this amendment may be found, for example, in FIG. 6.

The paragraph beginning on page 14, line 1 has been amended by adding "relatively non-compressible" (two occurrences); and by adding "non-cylindrical". Support may be found, for example, in FIGS. 11-14 and the corresponding original written description.

The paragraph beginning on page 14, line 16 has been amended by adding "non-cylindrical". Support may be found, for example, in FIGS. 11-14 and the corresponding original written description.

The paragraph beginning on page 14, line 23 has been amended by adding "extend between the upper and lower sides of support 161, and they"; and by adding "In an embodiment, ECEs 164 have a dimension equal to or exceeding the thickness of the flexible support 161." Support may be found, for example, in FIGS. 11-12 and the corresponding original written description.

Amendments to Claims 35-36, 39, 42-45, 48, 51-54, 56-57, 59-60, 63, 65-66, and 69-70

Claims 35-36, 39, 42-45, 48, 51-54, 56-57, 59-60, 63, 65-66, and 69-70 been amended.
No new matter has been introduced.

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Each of the independent claims 35, 44, 53, 56, 59, 65, and 69 has been amended to recite that the flexible support has a relatively uniform thickness, and upper and lower sides. In addition, each of the independent claims has further been amended to recite "a plurality of electrically conductive, relatively non-compressible particles within the flexible support, wherein selected particles have a dimension equal to or exceeding the thickness of the flexible support, wherein the selected particles extend between the upper and lower sides, and wherein the selected particles have an irregular, non-cylindrical shape". Support for these amendments may be found, for example, in FIGS. 11-12 and in the corresponding written description.

Further, each dependent claim previously reciting "elements" has been amended to recite "particle".

In addition, dependent claims 39, 48, and 63 have been amended by substituting the phrase "wherein the particles are formed of material from the group consisting of silicon, glass, quartz, and diamond" for "wherein the elements comprise a compressible material". Support may be found, for example, on page 14, lines 3-4 of the written description.

No new matter has been added by way of these amendments to the claims.

Rejection of Claims 59-72
Under 35 U.S.C. §102(b)
as Anticipated by Bourdelaise

Claims 59-72 were rejected under 35 U.S.C. §102(b) as being anticipated by Bourdelaise (U.S. 5,109,320).

Bourdelaise discloses a system for connecting integrated circuit dies to a printed wiring board in which compressible wire buttons 59 are retained in an interface 78 (FIG. 8).

The rule under 35 U.S.C. §102 is well settled that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). MPEP §2131.

Bourdelaise fails to disclose "a plurality of electrically conductive, relatively non-compressible particles within the flexible support, wherein selected particles have a dimension equal to or exceeding the thickness of the flexible support, wherein the selected particles extend

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between the upper and lower sides, and wherein the selected particles have an irregular, non-cylindrical shape”.

For the above reasons, independent claims 59, 65, and 69 should be found to be allowable over Bourdelaise, and Applicants respectfully request that the rejection of claims 59, 65, and 69 under 35 U.S.C. §102(b) as anticipated by Bourdelaise be withdrawn.

All claims dependent upon independent claims 59, 65, and 69 are also asserted to be allowable for the reasons presented above.

**Rejection of Claims 35-39, 42-48 and 51-55
under 35 U.S.C. §103(a) as Unpatentable
over Scholz in view of Smolley or Bourdelaise
and Akkapeddi and Kuozkowski and Kang**

Claims 35-39, 42-48 and 51-55 were rejected under 35 U.S.C. §103(a) as being unpatentable over Scholz (U.S. 5,329,423) in view of Smolley (U.S. 4,581,679 or U.S. 4,574,331) or Bourdelaise and Akkapeddi (U.S. 5,334,029) and Kuozkowski (“The Electrical Conductivity and Breakdown Phenomena in Polyester Polymer-Quinoline Salt of Tetracyanoquinodimethane Composites,” *IEEE*, pp. 158-162) and Kang (U.S. 5,958,590).

Scholz discloses a compressible connector (FIG. 3) in which solder bumps 58 are compressed into corresponding sockets 62 (FIG. 4).

Smolley discloses an insulated board having openings containing connector elements in the form of compressible wire wads (see Abstract).

Bourdelaise was discussed earlier.

Akkapeddi discloses a compressible connector 20 (FIG. 1) having conductive pins 63-64 (FIG. 3) to connect corresponding pads of printed circuit boards 12-14 (FIG. 1).

Kuozkowski discusses the results of experiments concerning the influence of the length of conducting particles within a filler on the electrical conductivity of composites obtained by embedding needle-like conducting crystals of quinoline salt of tetracyanoquinodimethane (see last paragraph of the Introduction).

Kang discloses dendritic powder materials, including particles 14 within a film 12 (FIGS. 2A-2B) or within a paste 60 (FIG. 3).

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To establish a *prima facie* case of obviousness under 35 U.S.C. §103, the prior art reference (or references when combined) must teach or suggest every limitation of the claim. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA, 1974). MPEP §2143.

The various asserted combinations of references fail to teach or suggest all of the claim limitations present in independent claims 35, 44, and 53, as amended, so a *prima facie* case of obviousness has not been established.

For example, none of the references applied in this rejection disclose a plurality of electrically conductive, relatively non-compressible particles within a flexible support, wherein selected particles have a dimension equal to or exceeding the thickness of the flexible support, wherein the selected particles extend between the upper and lower sides, and wherein the selected particles have an irregular, non-cylindrical shape.

For the above reasons, independent claims 35, 44, and 53 should be found to be allowable over any combination of Scholz, Smolley, Bourdelaise, Akkapeddi, Kuozkowski, and Kang, and Applicants respectfully request that the rejection of claims 35, 44, and 53 under 35 U.S.C. §103(a) as being unpatentable over various combinations of these references should be withdrawn.

All claims dependent upon independent claims 35, 44, and 53 are also asserted to be allowable for the reasons presented above. If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. MPEP §2143.03.

Rejection of Claims 35, 36, 44, 45, 53 and 54
under 35 U.S.C. §103(a) as Unpatentable
over Karnezos in View of Smolley or Bourdelaise
and Akkapeddi and Kuozkowski and Kang

Claims 35, 36, 44, 45, 53 and 54 were rejected under 35 U.S.C. §103(a) as being unpatentable over Karnezos (U.S. 4,813,129) in view of Smolley or Bourdelaise and Akkapeddi and Kuozkowski and Kang.

Karnezos discloses an interconnect structure for coupling two substrates, in which deformable conductive buttons 16 (FIG. 3) on one substrate deform against contact pads 28 on the other substrate.

Smolley, Bourdelaise, Akkapeddi, Kuozkowski, and Kang were discussed earlier.

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As mentioned above, independent claims 35, 44, and 53 have all been amended to recite a plurality of electrically conductive, relatively non-compressible particles within a flexible support, wherein selected particles have a dimension equal to or exceeding the thickness of the flexible support, wherein the selected particles extend between the upper and lower sides, and wherein the selected particles have an irregular, non-cylindrical shape. None of the applied references disclose this limitation. Thus claims independent 35, 44, and 53, and their respective dependent claims 36, 45, and 54 should all be allowable.

Applicants respectfully request that the rejection of claims 35-36, 44-45 and 53-54 under 35 U.S.C. §103(a) as being unpatentable over Karnezos (U.S. 4,813,129) in view of Smolley or Bourdelaise and Akkapeddi and Kuozkowski and Kang be withdrawn.

**Rejection of Claims 56-58 under 35 U.S.C. §103(a)
as Unpatentable over Debenham in View of Scholz,
and in Further in View of Smolley and Akkapeddi
and Kuozkowski and Kang**

Claims 56-58 were rejected under 35 U.S.C. §103(a) as being unpatentable over Debenham et al. (U.S. 6,365,421) in view of Scholz, and in further view of Smolley and Akkapeddi and Kuozkowski and Kang.

Debenham discloses a data processing system having a bus, display, external memory, and a processor (FIG. 1).

Scholz, Smolley, Akkapeddi, Kuozkowski, and Kang were discussed earlier.

As mentioned earlier, independent claim 56 has been amended. None of the references applied by the Examiner in this rejection disclose the added limitation, so independent claim 56 and its dependent claims 57-58 should all be allowable.

Applicants respectfully request that the rejection of claims 56-58 under 35 U.S.C. §103(b) as being unpatentable over Debenham in view of Scholz, and in further in view of Smolley and Akkapeddi and Kuozkowski and Kang be withdrawn.

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**Rejection of Claims 59-72 under 35 U.S.C. §103(a)
as Unpatentable over Scholz in view of Smolley**

Claims 59-72 were rejected under 35 U.S.C. §103(a) as being unpatentable over Scholz in view of Smolley.

Scholz and Smolley were discussed earlier.

As mentioned earlier, independent claims 59, 65, and 69 have been amended. None of the references applied by the Examiner in this rejection disclose the added limitation, so claims 59, 65, and 69 and their respective dependent claims should all be allowable.

Applicants respectfully request that the rejection of claims 59-72 under 35 U.S.C. §103(b) as being unpatentable over Scholz in view of Smolley be withdrawn.

**Rejection of Claims 59-72 under 35 U.S.C. §103(a)
as Unpatentable over Scholz in view of Bourdelaise**

Claims 59-72 were also rejected under 35 U.S.C. §103(a) as being unpatentable over Scholz in view of Bourdelaise.

Scholz and Bourdelaise were discussed earlier.

As mentioned earlier, independent claims 59, 65, and 69 have been amended. None of the references applied by the Examiner in this rejection disclose the added limitation, so claims 59, 65, and 69 and their respective dependent claims should all be allowable.

Applicants respectfully request that the rejection of claims 59-72 under 35 U.S.C. §103(b) as being unpatentable over Scholz in view of Bourdelaise be withdrawn.

Additional Elements and Limitations

Applicants consider additional elements and limitations of claims 35-39, 42-48, and 51-72 to further distinguish over the cited references, and Applicants reserve the right to present arguments to this effect at a later date.

Documents Cited But Not Relied Upon For This Office Action

Applicants need not respond to the assertion of pertinence stated for the references cited but not relied upon by the Office Action, because these references are not made part of the

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rejections in this Office Action. Applicants are expressly not admitting to this assertion and reserve the right to address the assertion should it form part of future rejections.

Conclusion

Applicants respectfully submit that claims 35-39, 42-48, and 51-72 are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' below-signed attorney, Walter W. Nielsen (located in Phoenix, Arizona) at (602) 298-8920, or Ann M. McCrackin (located in Minneapolis, Minnesota) at (612) 349-9592 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

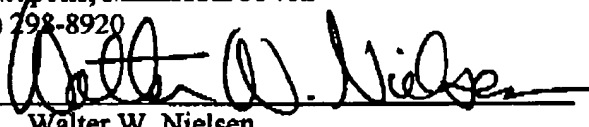
AJIT V. SATHE ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
Attorneys for Intel Corporation
P.O. Box 2938
Minneapolis, Minnesota 55402
(602) 298-8920

Date 6/14/2004

By


Walter W. Nielsen
Reg. No. 25,539

CERTIFICATE UNDER 37 CFR § 1.8: The undersigned hereby certifies that this correspondence is being transmitted via facsimile to 703-872-9306, addressed to: Attn: Examiner Xuan M. Thai, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 14th day of June 2004.

Name:

WALTER W. NIELSEN

Signature:

